

Chapter 4 Date and Conversion Functions

Converting From One Datatype To Another

- Comparisons must involve items of the same data type
eg: `WHERE type = 'BUS'`

eg: `WHERE length > 1500`
- You may need to **convert** one item to match the data type of another
eg: `WHERE issue = TO_DATE('01/01/2001', 'MM/DD/YYYY');`

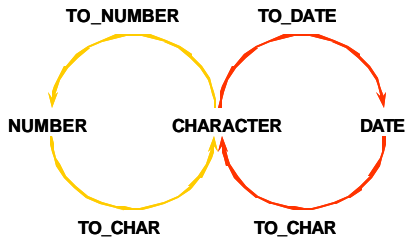
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Datatype Conversion Functions

- Are single-row functions
- Do not change the value **stored** in the field
 - provide a temporary, on-the-fly transformation for the lifetime of that specific SQL statement
- Use format masks to specify how to display the result of a conversion function

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Converting From One Datatype To Another



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TO_CHAR

```
TO_CHAR(date, 'fmt')
TO_CHAR(number, 'fmt')
```

- Converts a DATE or NUMBER to a VARCHAR2
- Commonly used to control how dates or numbers are displayed

```
SQL> SELECT ln, lastcontact, amount
FROM writer;
```

```
SQL> SELECT ln, TO_CHAR(lastcontact, 'mm/dd/yyyy'),
TO_CHAR(amount, '$9,990.99')
FROM writer;
```

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TO_NUMBER

```
TO_NUMBER(char[, 'fmt'])
```

- Converts a VARCHAR2 or CHAR to a NUMBER
- eg: `TO_NUMBER('250')`

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Numeric Format Models

Element	Description	Example	Result
<i>An</i>	Sets a display width of <i>n</i>	N/A	N/A
9	Single zero-suppression digit	999999	1234
0	Enforces leading zero	099999	01234
\$	Floating dollar sign	\$9999	\$1234
L	Local currency	L9999	L1234
.	Position of decimal point	9999.99	1234.00
,	Thousand separator	9,999	1,234

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TO_DATE

```
TO_DATE(char[, 'fmt'])
```

- Converts a VARCHAR2, CHAR, or NUMBER to a DATE
- eg: `TO_DATE('01/01/2001', 'MM/DD/YYYY')`
- eg: `TO_DATE('January 15, 2001, 11:00 A.M.', 'Month dd, YYYY, HH:MI A.M.')`
- `Month dd, YYYY, HH:MI A.M.'`

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Date Data Type

- Oracle stores dates in an internal numeric format that stores century, year, month, day, hours, minutes, seconds
- Can store values between Jan 1, 4712 BC to Dec 31, 9999 AD
- SYSDATE function returns current date and time
- The default date format is **DD-MON-RR**

```
SQL> SELECT sysdate FROM DUAL;  
SQL> SELECT TO_CHAR(sysdate, 'mm/dd/yyyy HH:MI:SS AM')  
FROM DUAL;
```

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Guessing Games

- What if you don't specify the century?
 - eg: 03-Mar-33
- Ambiguous when enter/display only 2 digit years
 - eg: what year is 15-MAR-02?
 - eg: what year is 15-MAR-88?
- To avoid ambiguity, enter/display 4 digit years

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RR Date Format

- When a two-digit date is entered under **RR** mask, Oracle infers (guesses) the century using the rules in the table below

		If the specified two-digit year is:	
		00-49	50-99
If two digits of the current year are:	00-49	The return date is in the current century	The return date is in the century before the current one
	50-99	The return date is in the century after the current one	The return date is in the current century

- thus TO_DATE('15-MAR-02', 'DD-MON-RR') refers to '15-MAR-2002'
- thus TO_DATE('15-MAR-98', 'DD-MON-RR') refers to '15-MAR-1998'

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YY Date Format (pg193)

- When a two-digit date is entered under **YY** mask, the date always has the same first 2 digits as the current year (i.e., the current century)
 - thus TO_DATE('15-MAR-02', 'DD-MON-YY') refers to '15-MAR-2002'
 - thus TO_DATE('15-MAR-98', 'DD-MON-YY') refers to '15-MAR-2098'

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Date Datatype

- Implicit conversion

```
SQL> SELECT title, issue
      FROM article
      WHERE issue = '01-JAN-01';
```

- Explicit conversion

```
SQL> SELECT title, issue
      FROM article
      WHERE issue = TO_DATE('01-JAN-2001', 'DD-MON-YYYY');
```

```
SQL> SELECT title, issue
      FROM article
      WHERE issue = TO_DATE('01/01/2001', 'MM/DD/YYYY');
```

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Date Formatting Models

YYYY	4-digit numeric year
RR	2-digit year in numbers, based on century rule
YEAR	Year spelled out
MON	Abbreviated name of month (eg. JAN, AUG)
MONTH	Name of month (eg. May, September). Always length of 9
MM	2-digit numeric month
DY	3-letter abbreviation of the day of the week (MON, SAT)
DAY	Full day of week (eg. Tuesday, Wednesday). Always length of 9
DD	Numeric day of month
Ddspth	Spells numeric day of month (eg. Third, TwentyFifth)
WW	Week of year (1-53)
Q	Quarter of the year
DDD	Day of year (1-366)

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Time Formatting Models

HH24	Hour in military format (0-23)
HH or HH12	Hour (0-12)
MI	Minutes
SS	Seconds
:	Separator
AM or PM	Indicate AM or PM

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Practice Time: Using Date/Time Format Masks

```
SQL> SELECT course_no, start_date_time
       FROM section;

SQL> SELECT course_no,
       TO_CHAR(start_date_time, 'DD-MON-YYYY HH24:MI')
       FROM section;

SQL> SELECT course_no,
       TO_CHAR(start_date_time, 'Day mm/dd/yyyy')
       FROM section;
```

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Using Date/Time Format Masks

- Watch out for **case** and for **spaces** provided by masks

```
SQL> SELECT section_id,
       TO_CHAR(start_date_time, 'mm-dd-yyyy DAY')
       FROM section
       WHERE TO_CHAR(start_date_time, 'DAY') = 'Friday';
```

```
SQL> SELECT section_id,
       TO_CHAR(start_date_time, 'mm-dd-yyyy DAY')
       FROM section
       WHERE TO_CHAR(start_date_time, 'DAY') = 'FRIDAY';
```

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Using Date/Time Format Masks

- Fill Mode
 - suppresses extra blanks provided by certain format masks

```
SQL> SELECT course_no, section_id,
       to_char(start_date_time, 'DAY')
       FROM section
       WHERE to_char(start_date_time, 'fmDAY') = 'FRIDAY';
```

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Are These WHERE Clauses Equivalent?

```
SQL> SELECT course_no, TO_CHAR(start_date_time, 'Month dd, yyyy')
FROM section
WHERE start_date_time < TO_DATE('May 14, 2003', 'Month dd, yyyy');
```

```
SQL> SELECT course_no, TO_CHAR(start_date_time, 'Month dd, yyyy')
FROM section
WHERE TO_CHAR(start_date_time, 'Month dd, yyyy') < 'May 14, 2003';
```

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Using Dates and Times

- When no time is provided, Oracle stores a default time of midnight
- When no day of month is provided, Oracle stores a default day of 1

```
SQL> SELECT TO_CHAR(issue, 'mm/dd/yyyy hh:mi am')
FROM article;
```

- Watch out for times... queries may not perform as expected

```
SQL> SELECT course_no, start_date_time
FROM section
WHERE start_date_time = '14-JUL-03';
```

```
SQL> SELECT DISTINCT
TO_CHAR(start_date_time, 'MM/DD/YYYY HH:MI AM')
FROM section;
```

```
SQL> SELECT course_no, start_date_time
FROM section
WHERE TRUNC(start_date_time) = '14-JUL-03';
```

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Performing Date & Time Arithmetic

- Add/subtract a **number** to/from a date for a resulting date
- Subtract two dates to find the number of days in between

```
SQL> SELECT registration_date, registration_date + 7
FROM student;
```

```
SQL> SELECT TO_DATE('13-JAN-08') - TO_DATE('31-DEC-07') "Day #"
FROM dual;
```

- Add **hours** to a date by dividing the number of hours by 24
- Add **minutes** to a date by dividing the number of minutes by 1440

```
SQL> SELECT TO_CHAR(SYSDATE, 'mm/dd/yyyy hh:mi AM'),
TO_CHAR(SYSDATE+3/24, 'mm/dd/yyyy hh:mi AM'),
TO_CHAR(SYSDATE+30/1440, 'mm/dd/yyyy hh:mi AM')
FROM DUAL;
```

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Practice Time: Date & Time Arithmetic

- User `ttrollen` has a table named `workorder`
- Review its structure
- Display its contents, show date and time for each date
- Calculate the duration of each `workorder`

WORKORDERID	INITIATED	COMPLETED	DAYS	HOURS	MINUTES
19	01/15/2007 09:15 am	01/15/2007 11:30 am	.09375	2.25	135
20	01/15/2007 10:30 am				
21	01/15/2007 11:45 am	01/15/2007 04:30 pm	.197916667	4.75	285
22	01/16/2007 03:00 pm	01/16/2007 04:55 pm	.079861111	1.91666667	115
23	01/16/2007 03:15 pm				
24	01/16/2007 04:05 pm	01/19/2007 04:15 pm	3.00694444	72.1666667	4330
25	01/15/2007 10:00 am	01/16/2007 10:00 am	1	24	1440

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Date Functions

MONTHS_BETWEEN(date2, date1)	Number of months between two dates
ADD_MONTHS(date, integer)	Add calendar months to date
NEXT_DAY(date, dayofweek)	Next day of the date specified
LAST_DAY(date)	Last day of specified month
TRUNC(date)	Truncate date to omit time info
ROUND(date, [format_mask])	Round date
EXTRACT(datepart FROM date)	Extracts numeric year, month or day from DATE datatype (not time elements) Extracts numeric year, month, day, hour, minute, second from TIMESTAMP datatype

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Cast Function

CAST(expression AS datatype)

- Converts among common Oracle data types
 - VARCHAR2, CHAR, NUMBER, DATE
- An alternative to using type conversion functions

```
SQL> SELECT title, issue
      FROM article
      WHERE issue = TO_DATE('01-JAN-2001', 'DD-MON-YYYY');
```

```
SQL> SELECT title, issue
      FROM article
      WHERE issue = CAST('01-JAN-2001' AS DATE);
```

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